

In the Specification:

[0030] Example imine derivatives include acetamidine, acetamidine salts, acetamidine derivatives, arginine, arginine salts, arginine derivatives, formamidine, formamidine salts, formamidine derivatives, guanidine derivatives, guanidine salts and mixtures thereof. Preferred imine derivatives of formula (I) include, for example, acetamidine hydrochloride, amino-guanidine hydrochloride, arginine, formamidineformanimide, formamidinesulfinic acid, formamidine acetate, 1,3-diphenyl guanidine, 1-methyl-3-nitroguanidine, guanidine hydrochloride, tetramethylguanidine, 2,2-azobis (dimethyl-propionamidine)di-HCl, guanidine sulfate, guanidine acetic acid, guanidine carbonate, guanidine nitrate and mixtures thereof.

[0036] The tantalum barrier removal agent may be acetamidine, acetamidine salts, acetamidine derivatives, arginine, arginine salts, arginine derivatives, formamidine, formamidine salts, formamidine derivatives, guanidine derivatives, guanidine salts and mixtures thereof. These barrier removal agents appear to have a strong affinity for tantalum barrier materials and titanium-containing materials at acidic pH levels. This affinity appears to accelerate the barrier removal rate with limited abrasive or optionally, without the use of any abrasives. This limited use of abrasive allows the polishing to remove the tantalum barrier at a rate greater than the dielectric and the metal interconnect. Particular effective derivatives and salts include acetamidine hydrochloride, amino-guanidine hydrochloride, arginine, formamidineformanimide, formamidinesulfinic acid, formamidine acetate, guanidine hydrochloride, guanidine sulfate, guanidine acetic acid, guanidine carbonate, guanidine nitrate and mixtures thereof. Preferably, the solution contains 0.01 to 12 weight percent barrier removal agent. For purposes of this specification, all concentrations have values expressed in weight percent based upon the total

weight of the polishing composition, unless specifically noted otherwise. Most preferably, the solution contains 0.1 to 10 weight percent barrier removal agent and for most applications, barrier removal agent concentrations between 0.2 and 6 weight percent provide sufficient barrier removal rates.